International Journal of Research Publication and Reviews

A STUDY TO ASSESS THE PRESCRIPTION PATTERN, DRUG INTERACTION AND QUALITY OF LIFE ASSOCIATED WITH POLYPHARMACY AMONG GERIATRIC PATIENTS IN RURAL HOUSEHOLD

Abhaya Krishna S S[1], Ajila Raj S S[1], Neethu V[1], E. Sam Jeeva Kumar[2], Dr. Prasobh G R[3]

[1]B Pharm Student, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India, 695502
[2]Head, Department of Pharmacy Practice, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India, 695502
[3]Principal, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India, 695502
E-mail: abhayakrishna14@gmail.com

ABSTRACT

The escalating use of prescribed drug has increasingly raised concern about Polypharmacy. Inappropriate Medication use (IMU) by elderly patients is a public health problem associated with adverse effects on health. Older patients often have numerous co-morbidities for which they are prescribed multiple medications, thereby increasing the risk or Drug interaction. This risk is compounded by age related changes in physiology and body composition, which influence drug handling and response several characteristics of ageing, such as decreased renal function and altered fat and water distribution, as well as mental impairment. The quality of life in elderly population can be affected by many environmental factors.

This is a Prospective Observational Study conducted at community (in Parassala location). In this study, we analyze the drug interaction and quality of life while taking polypharmacy in elderly people. Suitably designed Proforma is used to assess drug interaction. Polypharmacy was assessed using proforma and also through interviewing patients. Quality of life were assessed using WHOBREF Questionnaire method.

A total of 150 geriatric patients with polypharmacy fulfilling the study criteria are selected. From the prescription Pattern analysis, Antihypertensive and Proton Pump inhibitors are widely used in the prescription of geriatric patients with polypharmacy. Polypharmacy was assessed by using proforma. Drug interactions were also assessed using appropriate software such as Drugs.com. adequate prescription monitoring was done through the appropriate patient's interview. the quality-of-life were assessed by using WHOQOL- Brief Questionnaire method.

In our study, we suggest that 52.6 % of patients, which is a higher percentage, were taking antihypertensive as per prescription pattern analysis. in case of drug interaction, only 44.6% geriatrics patients were reported .in 17.91% geriatric patients reported with minor drug interaction. In quality of life, the domain score is categorized into very good, moderately good and very poor.

In QOL, 25.3% were included in very poor, 22.7% in very good, 25.3% are in moderate poor and 26.7% are included in moderate good category.

Keywords: *Prescription pattern, Drug-drug interaction, Quality of life, Polypharmacy, Geriatrics*

1. INTRODUCTION

Geriatric is the branch of general medicine concerned with the clinical, preventive, remedial and social aspects of illness in the elderly. The term 'elderly´ generally refers to patients aged 65 years or ever. However, the physiological changes that occur with ageing are progressive, occurring gradually over a lifetime rather than abruptly at any given chronological age, so the choice of 65 years Is a relatively arbitrary one, & the definition is sometimes.

Elderly patients have multiple choice conditions and take numerous medications. They need to be educated on their disease states and be aware of potential adverse effect & drug interaction. Consulting with their physicians and pharmacist & behavioral modifications are good places to start. Geriatric patients are at increased risk for drug interaction. Incidence of drug interaction in patients over age 65 is two or three time greater compared to younger patients. Factors that are responsible for the higher prevalence of ADRs in the geriatric population include polypharmacy, poor relationship with healthcare providers. Multiple disease states, increasing severity of illness, reduced drug elimination, and increased sensitivity to drug effects.

As a result of increased prevalence, older people tend to use more medications compared to younger people. Studies throughout the developed world have found a direct correlation between advancing age and number of medications prescribed. E.g.: in Australia people over the age of 65 comprise12

per cent of the population, yet 40 percent of all prescription dispensed are for this age group. Similar data have been reported from the United States and United Kingdom.

The term Polypharmacy has been used to describe the prescription or use of multiple medications. Increasing the number of medications prescribed has been shown to independently increase risk of adverse drug reaction (ADRs), and for this reason unnecessary polypharmacy must be avoided. Other reason to avoid unnecessary polypharmacy are to minimize cost and enhance (the more medications a patient has to take, the poorer their compliance). However, this needs to be balanced against the fact that use of multiple medications in elderly patients is sometimes unavoidable, and may be appropriate in cases where an older patient suffers from several coexisting medical conditions for which drug therapy has been proven to reduce morbidity and / or mortality.

Drug interactions are an increasingly important cause of adverse drug interactions and it is vital that pharmacist have a sound understanding of the issue. Today, with the increasing availability of complex therapeutic agents and widespread polypharmacy, the potential for drug interaction is enormous. Despite rigorous attempts to ensure that the safety profile of new medicines is as fully defined as possible at the time they are marketed, the potential for adverse interaction is not always evident.

An interaction is said to occur when the effects of one drug are changed by the presence of another drug, food, drink or an environmental chemical agent. The net effect of the combination may be:

- Synergism or additive effect of one or more drugs

- Antagonism of effect of one or more drugs

- Alteration of effect of one or more drugs or the production of idiosyncratic effects.

In the present-day competitive environment, there is a concern that health care quality is being compromised in the rush to lower costs. This has resulted in the concept to focus the evaluation of health care on the assessment of end result or outcome associated with the health care.

There are different types of outcomes for drug interventions in health care. Rate of disease recurrence, rate of hospitalization, reduction in mortality are examples of parameter considered as evidence of drug efficacy. Doctors often depend on the manner in which the drugs influence various physiological functions to assess the efficacy of the drugs. Sometimes the physiological status may change without the patient feeling better. Drugs may ameliorate certain symptoms without a measurable Change in the physiological function. Sometimes prolonging a life may be achieved at the expense of pain and sufferings. There can be variations in the evaluation of different outcomes.

2. METHODOLOGY

STUDY SITE:

The study was conducted at the Community pharmacy (Parassala location)

STUDY DESIGN:

Prospective Observational Study was conducted in elderly patients of age above 60 years from the Community Pharmacy, whose Prescription pattern were analyzed for polypharmacy and for the possible drug interaction after obtaining permission from the Institutional Ethical Committee.

STUDY DURATION:

The study was carried out for a period of 6 months after getting clearance from the Institution Ethical Committee of Sree Krishna College of Pharmacy and Research Centre.

SAMPLING STRATEGY

A. **Inclusion criteria**

- Patients above 60 years.

- Patients willing to participate

- Patients who give informed consent.

B. **Exclusion criteria**

- Patients not ready to respond to the query

- Unconscious patients.

C. **SAMPLE SIZE**

- 150 Patients

3. STUDY PROCEDURE

This prospective observational study was intended to be carried out in elderly patients and the prescription pattern was analyzed for polypharmacy and possible drug interaction and quality of life. The target sample size was 150.

This study was conducted after getting clearance from the Institutional Human Ethical Committee.

This study was conducted in elderly patients having age above 60 years and who is on polypharmacy and assessed for any drug interaction and quality of life after satisfying predefined inclusion and exclusion criteria. Prescription pattern were analyzed by using suitably designed proforma. Drug interaction were assessed by using Drug. Com software. Quality of life were assessed by WHOQOL-BREF Questionnaire method. Polypharmacy was assessed by using suitably designed proforma and through interviewing the patients.

DATA COLLECTION TOOLS

- Questionnaire to collect information about geriatric population

- Questionnaire to assess quality of life.

DATA ENTRY AND ANALYSIS

After getting the data will be analyzed and suitably tabulated and formulated and presented. A suitable statistical analysis will be carried out.

OBSERVATION AND RESULT

From Community Pharmacy, as per the study criteria 150 elderly Patients with Polypharmacy were enrolled in the study. This study aimed to analyze the prescription pattern, quality of life and drug interaction associated with polypharmacy among geriatric population in community.

AGE WISE DISTRIBUTION

Among 150 patients screened, 57.3% (86) of patients were in the age group of 60- 69 years, 30.6% (46) of patients were in the age group of 70-79 years, 11.3% (17) of patients were in the age group of 80-89 years and 0.6% (1) of patient were in the age group of 90- 99 years.

AGE IN YEARS	NUMBER OF PATIENTS (n=150)	PERCENT
60-69	86	57.3
70-79	46	30.6
80-89	17	11.3
90-99	1	0.6
Total	150	100

Table No. 1: Age wise distribution of patients based on percentage

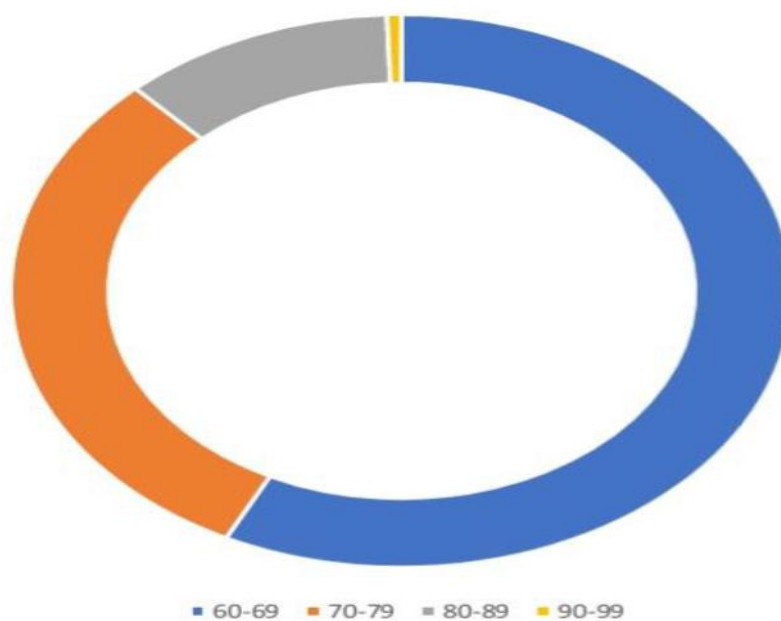■ 60-69 ■ 70-79 ■ 80-89 ■ 90-99

Figure No.1: Age Wise Distribution

GENDER WISE DISTRIBUTION

The gender wise distribution of patients was shown in the following table.

GENDER	NUMBER OF PATIENTS (n=150)	PERCENT
Male	62	41.33
Female	88	58.66
Total	150	100

Table No. 2: Percentage distribution of patients based on gender

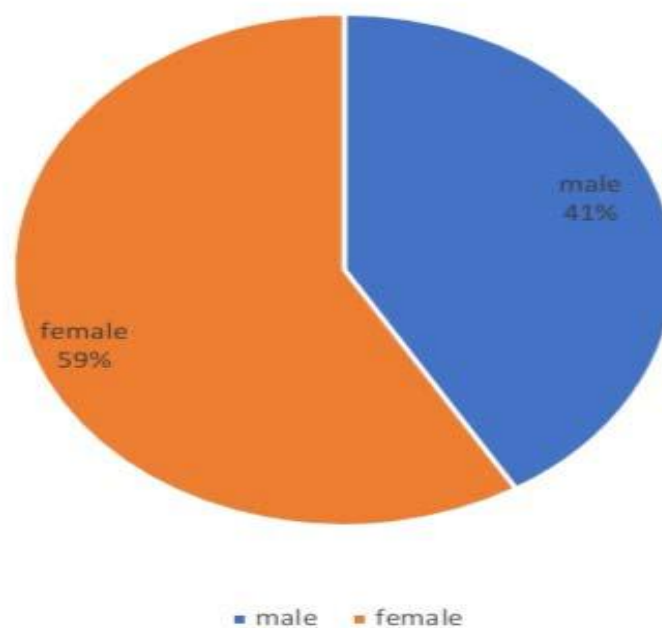From table2, it was observed that out of the total geriatric patients, 41.33% were males and 58.66% were females.

Figure No.2: Gender Wise Distribution

BASED ON ECONOMIC DETAILS

Based on economic details of patients was shown in the following table.

ECONOMIC CATEGORY	NUMBER OF PATIENTS	PERCENT
APL	100	66.66
BPL	50	33.33
Total	150	100

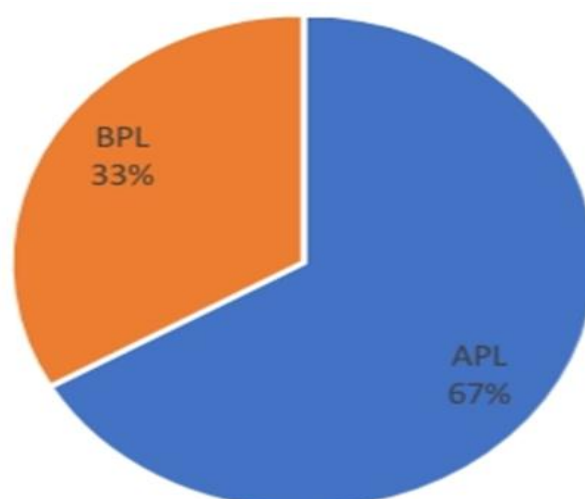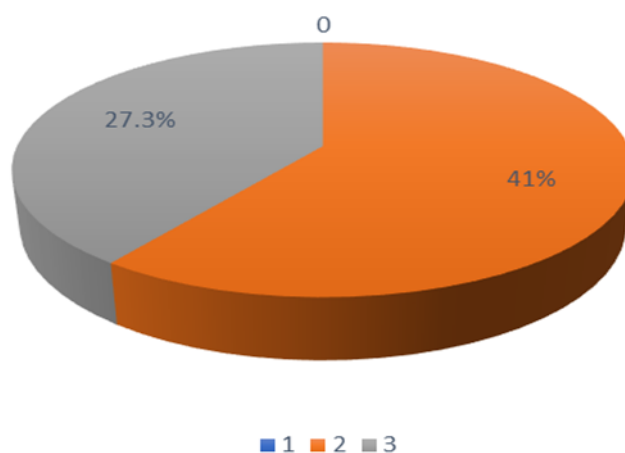**Table No. 3: Percentage distribution of patients based on economic details**

Figure No.3: Economic Wise Distribution

BASED ON FOODS TAKEN

Based on food taken category of patients was shown in the following table.

FOOD	NUMBER OF PATIENTS (n=150)	PERCENT
Veg	41	27.33
Non -veg	109	72.66
Total	150	100

Table No. 4: Percentage distribution of patients based on food taken

Figure No.4: Food Category Base Distribution

PRESCRIPTION PATTERN ANALYSIS

A total of 150 prescription were analyzed which contain 57 drugs. The drugs were arranged in their generic names by using IBM MICROMEDEX software. Individual drugs prescribed in geriatric population was shown in **Table No.5**

SL. NO.	CLASS OF DRUGS	DRUG NAME	NUMBER OF PATIENTS
1	Proton Pump Inhibitor	Pantoprazole	55
		Esomeprazole	1
		Rabeprazole	4
		Omeprazole	2
2	Antidiabetics	Insulin	10
		Metformin	23
		Glimepiride	18
		Sitagliptin	4
		Gliclazide	2
		Volgibose	4
3	Antihypertensives	Diltiazem	2
		Furosemide	14
		Telmisartan	17
		Losartan	14
		Metoprolol	10
		Amlodipine	13
		Cilnidipine	4
		Spironolactone	5

		Meropenem	03
		Cefoperazone	03
		Azithromycin	02
		Cefuroxime	03
		Moxifloxacin	01
4	Antibiotics	Ciprofloxacin	01
		Cefixime	03
		Amoxycillin	06
		Norfloxacin	02
		Ciprofloxacin	01
		Amoxycillin/Clavulanic acid	04
5	Thyroid Hormone Analogue	Thyronorm	10
6	Vitamin Supplement	Multivitamins	33
7	Antiplatelet	Aspirin	23
		Clopidogrel	24
		Cilostazol	02
8	Antiemetics	Domperidone	04
9	Anticonvulsant	Gabapentin	03
		Phenytoin	03
10	Corticosteroids	Dexamethasone	02
		Prednisolone	01
11	NSAIDs	Acetaminophen	23
		Chymoral forte	03
		Aceclofenac	13
		Diclofenac	07
12	Hepatoprotectives	Ursodeoxycholic acid	03
13	Laxatives	Lactulose	02

14	Antirespiratory	Budesonide	02
		Terbutaline	01
		Montelukast	09
		Deriphylline	12
		Salbutamol	04
		Theophylline	01
15	Anticoagulant	Enoxaparin	01
16	Antihyperlipidemic	Atorvastatin	25
		Rosuvastatin	08
17	H2 Blockers	Ranitidine	24
		Levocetirizine	01
18	Antiviral	Fluvir	01

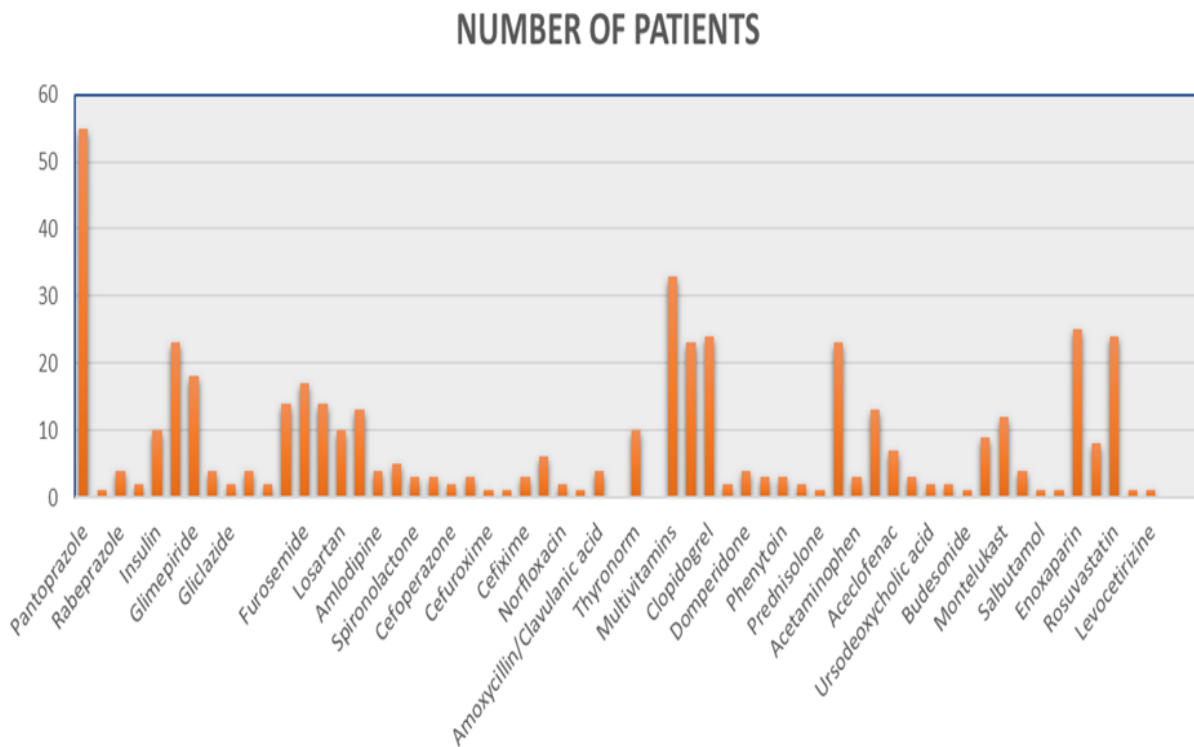**Table No.5 Individual drugs prescribed in Geriatric Population**

Figure No.5: Diagrammatic representation of percentage assessment of prescription pattern in total population

From Figure , it was observed that out of 150 patients 52.6% were prescribed with Antihypertensives, 41.3% of patients were prescribed with Proton pump inhibitors, 40.6% of patients were prescribed with Antidiabetics, 32.6% were given Antiplatelet, 30.6 % were given NSAIDs, 22% were given Vitamin supplements, 19.3% were given Anti respiratory, 18% were given Antibiotics, 6.6% were given Thyroid hormone analogue, 4% were given Anticonvulsant, 2.6% were given Antiemetic, 2% were given Corticosteroids, 2% were given Hepatoprotectives, 1.3% were given Laxatives, 0.6% were given Anticoagulant. Thus, we conclude that higher percentage of the patient were prescribed with Antihypertensives followed by Proton pump inhibitors, Antidiabetics etc.

4.   POSSIBLE DRUG -DRUG INTERACTION

PERCENTAGEDISTRIBUTION OF PATIENTS BASED ON THE DRUG INTERACTION

The percentage distribution of patients based on the drug interactions is shown in the following **Table No:6**

DRUG INTERACTIONS	NUMBER OF PATIENTS	PERCENT
Absent	83	55.3
Present	67	44.6
Total	150	100

Table no: 6 Percentage distribution of patients based on drug interactions
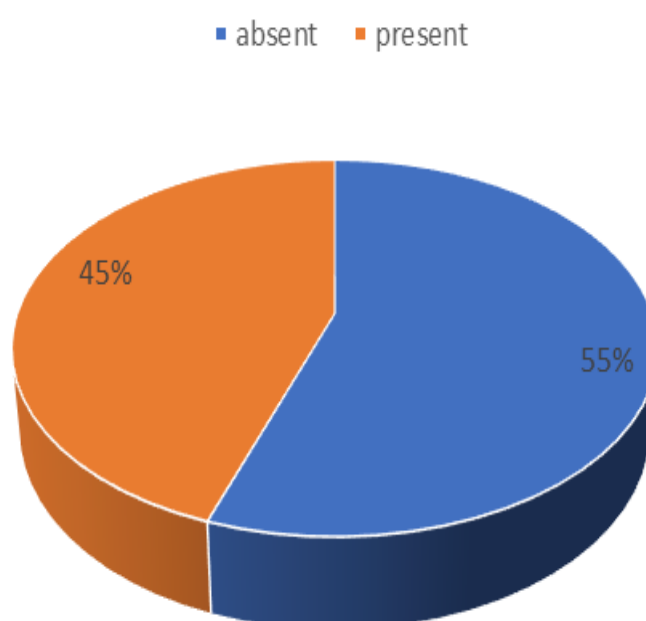

Figure No.5: Distribution of patients based on drug interactions

From the table, it was observed that 77% of the patients were reported with drug interaction. 23% of the patients were not reported with drug interaction. From the above table, we concluded that 77% of the geriatric patients taking polypharmacy were reported with drug interactions.

5.   PERCENTAGE DISTRIBUTION OF DRUG INTERACTION BASED ON SEVERITY

The percentage distribution of patients based on severity of drug interaction is shown in the following **Table No:7**

SEVERITY	NUMBER OF DRUG INTERACTIONS	PERCENTAGE %
Major	12	17.91
Moderate	26	38.80
Minor	29	43.2

Table No: 7Percentage distribution of drug interaction based on severity
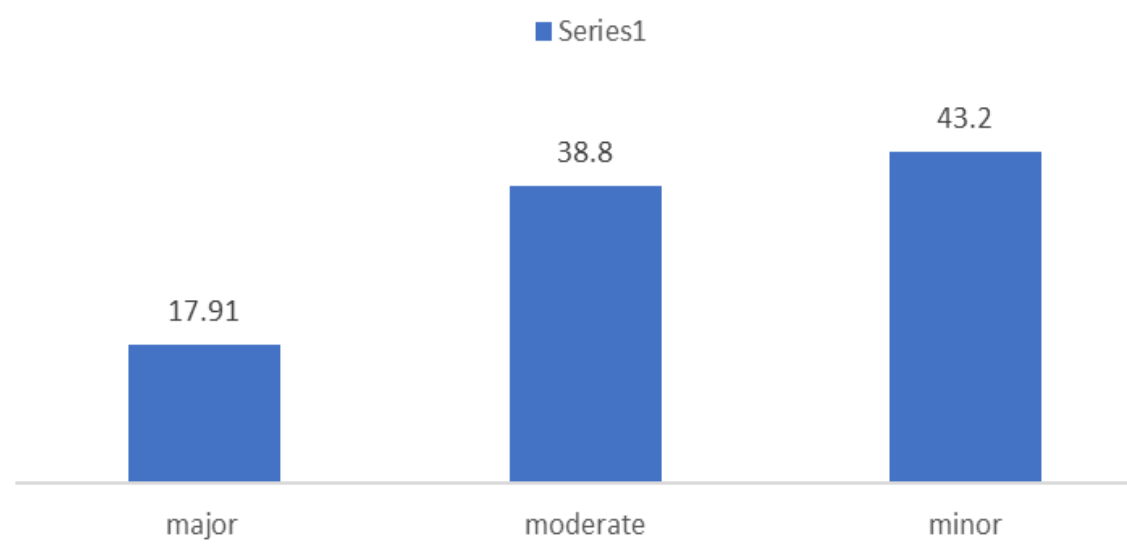

Figure No.6: Percentage distribution of drug interaction based on severity

From the table X, it was observed that 12.9% minor interactions, 7.6 % Major interactions and 79.4 % moderate interactions are observed. Thus, we concluded that higher percentage of the patients had moderate interactions.

Domain wise quality of life

Domain	Median	Mean	SD	Very Good		Moderate Good		Moderate Poor		Very Poor	
				%	95%CI	%	95%CI	%	95%CI	%	95%CI
Social	50	55.31	17.04	19.3	13.17-26.24	28.7	21.29-36.16	22.7	16.02-29.83	29.3	21.89-36.85
Environmental	56	56.78	15.88	16.7	10.94-23.32	22.7	16.02-29.83	33.3	25.50-40.97	27.3	20.10-34.76
Physical	44	48.10	15.79	24.7	17.75-31.96	23.3	16.59-30.54	21.3	14.87-28.40	30.7	23.08-38.23
Psychological	44	49.25	17.13	21.3	14.87-28.40	26	18.93-33.37	26	18.93-33.37	26.7	19.51-34.07
Total	207	209.44	37.87	22.7	16.02-29.83	26.7	19.51-34.07	25.3	18.34-32.66	25.3	18.34-32.66

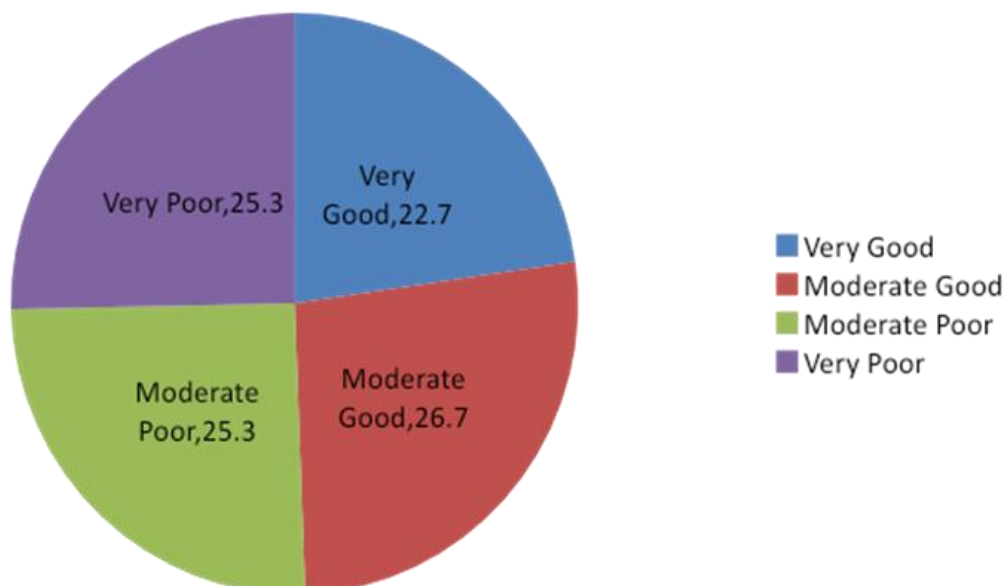**Table No: 8 Domain wise quality of life**

Figure No.7: Domain wise quality of life

The domain score is categorized into very good i.e., scoring above 75th percentile, moderately good i.e., scoring between 75th percentile and 50th percentile Moderately Poor i.e., between 50th percentile and 25th percentile and very poor i.e., below 25th percentile.

6. DISCUSSION

Inappropriate medication use is the most problem associated with geriatric people. Proper use of medications can alleviate symptoms and decrease elderly patient's morbidity and mortality. Polypharmacy can lead to medication non-adherence, drug-drug interaction, adverse drug reactions and the worsening of health condition.

This study aims to analyses the prescription pattern, drug reactions, drug interaction and quality of life associated with polypharmacy among geriatric population. In this study, 150 geriatric patients taking polypharmacy were taken. Possible drug interaction was assessed by using drug interaction checker, polypharmacy was assessed from Proforma and quality of life assessed by WHOBREF questionnaire method.

A study on the topic "polypharmacy leading to adverse drug reaction and interaction in elderly in a tertiary care hospital "by*Ayesha Romana* et al has shown that majority of the elderly patients received more than seven drugs and adverse drug reaction and drug interaction also noted due to polypharmacy.

A study conducted by *Rushabh J Dagli* et al on the topic "Polypharmacy: a global risk factor for elderly people "concludes that Polypharmacy can also lead to decreased medication compliance, poor quality of life, and unnecessary drug expenses. This is similar to our study that patients taking polypharmacy are at higher risk of having drug interaction.

A study on "Harmful drug -drug interaction due to polypharmacy in hospitalized patients in Goa medical college" by Akshay Khadeparkar et al demonstrated that Polypharmacy was seen in 751 out of 5424 prescriptions with highest rates from Department of Medicine. Super polypharmacy was seen in 79 prescriptions. This study concluded that it is important to remember that various groups such as the elderly are more susceptible to drug interaction.

A study by Yelbeneh Abayneh Assefa et al on the topic "Survey on polypharmacy and drug-drug interactions among elderly people with cardiovascular disease at Yekatit 12 Hospital "concludes the prevalence of polypharmacy was found associated with increased number of co-morbidity and inpatient prescriptions. The prevalence of total and serious potential drug-drug interactions was 84.3% and 17.3% respectively. The prevalence of potential drug-drug interaction was significantly associated with polypharmacy and polymorbidity. A higher incidence of polypharmacy and increased risk of potential drug-drug interactions in elderly people with cardiovascular disease are major therapeutic issues.

A study on "polypharmacy and Potential Drug – Drug interactions among elderly patients admitted in department of medicine of tertiary care hospital in Puducherry" by *Karthik Janardan Salwe* et al demonstrated that the patients are taking more than 5-6 drugs and 52.69% potential drug-drug interactions were observed on admission. Most common drug interactions observed in patients were of minor grade. This study concludes that polypharmacy leads to more potential drug-drug interactions. This is similar to our study that patients taking polypharmacy are having minor drug-drug interactions.

A study by *Alessandro Nobili* et al on the topic "Multiple disease and polypharmacy in elderly: challenges for the internist of the third millennium "demonstrated that the internist of the third millennium must extent their paradigm of care beyond their specialty and embrace a multi system approach, taking account of age-related changes, functional and congitive impairment, co-morbidities, polypharmacy, psychological factors, socioeconomic

factors and personal preferences. This shift is essential for individulized care of older people, for more rational and conservative drug prescribing and to innovate evidence-based medicine with specific attention to clinical outcomes and patient satisfaction.

A study on" Polypharmacy and potential drug-drug interactions in Home- Dwelling older people a cross sectional study" by *Monica Hermann* et al a high prevalence of polypharmacy and pDDIS with both prescription and non-prescription drugs in older home dwelling individuals. Close monitoring of the patients at risk of pDDIs, increased awareness of the potential of OTC drugs to cause DDIs, and good communication between the general practitioners and patient is needed to reduce the risk related to pDDI.

A study by Henok Getachew Tegegn et al on the topic medication related quality of life among Ethopian elderly patient with polypharmacy: a cross sectional study in and Ethiopia university hospital is concluded that the overall prevalence of poor MRQoL was 75.3% that implies polypharmacy result in poor quality of life in older patients.

7. CONCLUSION

Geriatric Patients account for an ever-increasing proportion of health care expenditure. They are prone to toxicity and injury from multiple concomitant disease States and polypharmacy. Ageing results in physiological changes which affect or alter the Pharmacokinetics of drugs. Chance for drug-drug interactions will get further increased by use of multiple drugs. Adverse effects increased with the number of drugs used by the patients.

In our study demonstrated that out of 150 patients 52.6% were prescribed with Antihypertensive, 41.3% of patients were prescribed with proton pump inhibitors 40.6% of patients were prescribed Antidiabetics 32.6% were given Antiplatelet and others was observed. In 7.6% have major type of drug interaction and 12.9% observed as minor type of drug interaction.

In Quality of life, from the study we concluded that 25.3% were included in very poor category of domain, 22.7% are in very good, 25.3 % in moderate poor and 26.7 % are in moderate good category.

The study includes evaluating appropriateness of prescription and assess the quality of life, assessing patients' physical conditions and drug interactions in polypharmacy. The major limitations of this study were that due to lack of cooperation of some patients which made it difficult to gather information required for completing the study. Another one was inadequate time period for completing the study, which affected the accuracy of the result to some extent. Another limitation of the study was that the patients were not able to categorize equally based on gender.

We found that polypharmacy was associated with higher symptom burden and worse quality of life in adults with life limiting illness. Areas for future research include developing deprescribing strategies to reduce the use of inappropriate medications in patients with limited life expectancies. Implementing and prospectively evaluating such strategies may help to determine the direction of associations between polypharmacy, symptoms burden and quality of life and improve patient centered outcomes in this vulnerable population.

8. REFERENCE

[1] Walker, Roger, and Cate and Whittlesea. Clinical pharmacy and therapeutics. Edinburgh churchil Livingstone,2007:149-158

[2] Dipro JT, Talbert RL, Yee GC, Matzke GR, Wells BG,Posey L M. Pharmacotherapy: a pathophysiologic approach. 8 th ed. Columbus (OH): McGraw-Hill; 2012:79-85

[3] R. R. Miller, "History of clinical pharmacy and clinical pharmacology," *The Journal of Clinical Pharmacology*, vol. 21, no. 4, pp. 195–197, 1981

[4] K. N. Barker and J. G. Valentino, "On a political and legal foundation for clinical pharmacy practice," *Journal of the American Pharmaceutical Association (1961)*, vol. 12, no. 5, pp. 202–237, 1972

[5] N. Barber, "Towards a philosophy of clinical pharmacy," *Pharmaceutical Journal*, vol. 257, pp. 289–291, 1999

[6] Harrison's principles of internal medicine 19th edition. New York: The McGraw-Hill Companies, Inc.; 2015:188-190

[7] Cahir C, Fahey T, Teeling M, tional population study. British Journal of Clinical Pharmacology.2010;69(5):543-552

[8] G Parthasarathy A Text Book Of Clinical Pharmacy Practice 2nd edition 123-129